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Jeffrey W. Book, Michel Rixen, Alessandro Carta, Mark S. Hulbert, Andrew J. Quaid, Emanuel Coelho, Vittorio Grandi, Lavinio Gualdesi

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During both a winter and summer period of 2006, SEPTR moorings were used for real-time monitoring of velocity , temperature, salinity, waves, and optics in a a dynamic frontal zone of the central Adriatic Sea. From the trawl-resistant barnacle like shaped SEPTR housings, velocities were measured acoustically. Other water column parameters were measured four times a day through a CTD profiler that was released to the surfaced and winched back into the protective mooring housing. Thus all variables of dynamic significance were monitored synoptically across a heavily fished coastal frontal zone.

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SHALLOW WATER ENVIRONMENTAL PROFILER IN TRAWL-RESISTANT REAL-TIME CONFIGURATION (SEPTR) USED FOR FRONTAL DYNAMICS RESEARCH

J. Book [1] *, M. Rixen [2], A. Carta [2], M. Hulbert [1], A. Quaid [1], E. Coelho [2], V. Grandi [2], L. Gualdesi [2]
[1] U.S. Naval Research Laboratory, Stennis Space Center, MS 39529, U.S.A. - book@nrlssc.navy.mil
[2] NATO Undersea Research Center, NATO, Viale San Bartolomeo, 19138 La Spezia, Italy

Abstract
During both a winter and summer period of 2006, SEPTR moorings were used for real-time monitoring of velocity, temperature, salinity, waves, and optics in a dynamic frontal zone of the central Adriatic Sea. From the trawl-resistant barnacle like shaped SEPTR housings, velocities were measured acoustically. Other water column parameters were measured four times a day through a CTD profiler that was released to the surface and winched back into the protective mooring housing. Thus all variables of dynamic significance were monitored synoptically across a heavily fished coastal frontal zone.
Keywords : Fronts, Adriatic Sea, Instruments And Techniques.

A Cooperative Agreement was established between the NATO Undersea Research Centre (NURC) and the U.S. Naval Research Laboratory (NRL) to establish the feasibility of carrying out real-time environmental assessments over longer time periods in shallow seas where commercial fishing is often intense. The work under this agreement built upon NRL/NURC past success of improving trawl-resistant bottom mounts for Acoustic Doppler Current Profilers (ADCP) [1] and NURC work on prototype systems for bottom-mounted profiling systems [2]. The result was five production units of Shallow water Environmental Profiler in Trawl-resistant Real-time configuration moorings (SEPTRs) that were tested and used during the winter and summer experiments of the Dynamics of the Adriatic in Real-Time (DART) international collaborative project. The moorings were used to study the frontal dynamics of the Western Adriatic Current (WAC) in the Gulf of Manfredonia area of the Adriatic Sea. Throughout three cruises, the moorings measured profiles of velocity, temperature, salinity, chlorophyll concentration, and backscattering at two wavelengths. The velocity profiles were acoustically measured every 15 minutes while other parameters were measured every six hours during CTD casts taken by a profiler that was released in the water column and winched back into the protective mooring housing after the brief measurement period. During these casts, an option was sometimes used to pause near the surface and also measure the surface wave spectrum and significant wave height. When at the surface, the profilers attempted to send all data back to a land-station via the Global-Star satellite system. During the summer cruises of DART, three SEPTRs deployed across the WAC demonstrated the importance of synoptically measuring both the thermohaline and velocity structure to gain understanding of frontal dynamics.

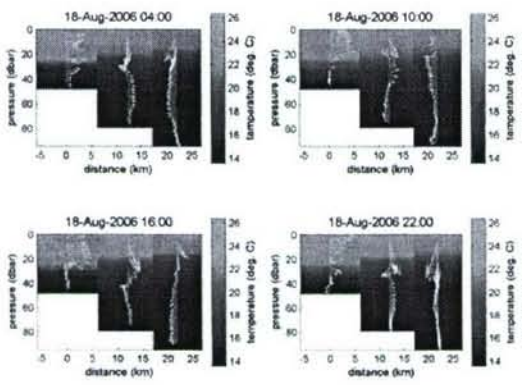

Fig. 1. Temperature and velocity measurements for 18-August 2006 from three SEPTRs deployed across the WAC. White arrows indicate 6-hour averages of ADCP measured velocities where upward is flow into the page, downward is flow out of the page, and horizontal is along-section flow. Shading indicates the profiler measured temperatures.

Figure 1 shows an example of SEPTR measured dynamic variables for a particular day. The profilers measured a relatively simple, but strong and consistent offshore rise in thermocline depth during this time. However, the measured velocities reveal multi-level structures with significant time dependence (tidal and inertial) and an interesting upper-layer flow at the inshore mooring directed along the section towards the oscillating WAC flow seen further offshore. Further analysis will be done using these direct measurements to understand the relative importance of geostrophic, advective, and other forces in determining the WAC frontal structure.

Acknowledgments
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2 - Grandi V., Carta A., Gualdesi L., de Strobel F. and Fioravanti S., 2005. An overview of SEPTR: Shallow Water Environmental Profiler in a Trawl-Safe Real-Time Configuration. *In*: Proceedings of the IEEE/OES Eighth Working Conference on Current Measurement Technology. IEEE, pp 142-146.